










## INTERSECTED CONE-SHAPED AIR FILTER FOR AN AUTOMOTIVE INTERNAL COMBUSTION ENGINE

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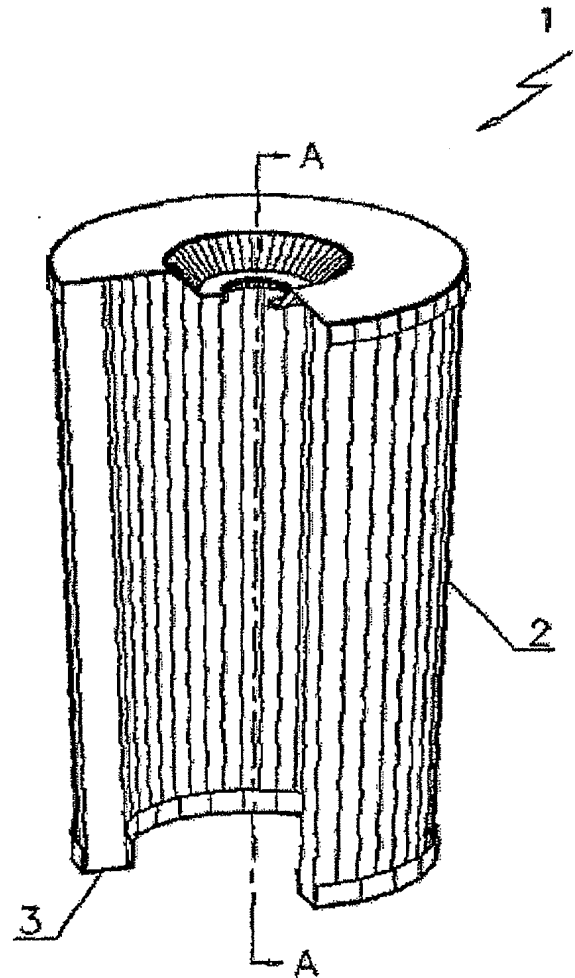
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### 要約 WO0201060

This invention relates to an intersected cone-shaped air filter (1) for focusing air flow within an automotive internal combustion engine which substantially comprises a hollow body (2) of specified thickness whose side dips 2 DEG to 7 DEG with respect to vertical axis, and a clamping ring (3) which is fixedly disposed along the outer periphery of the upper and the lower ends of the filter body (2) for strengthening the filter body construction. The air filter body is made up of symmetric longitudinally folded filter paper materials whose thickness governs that of the air filter body (2).



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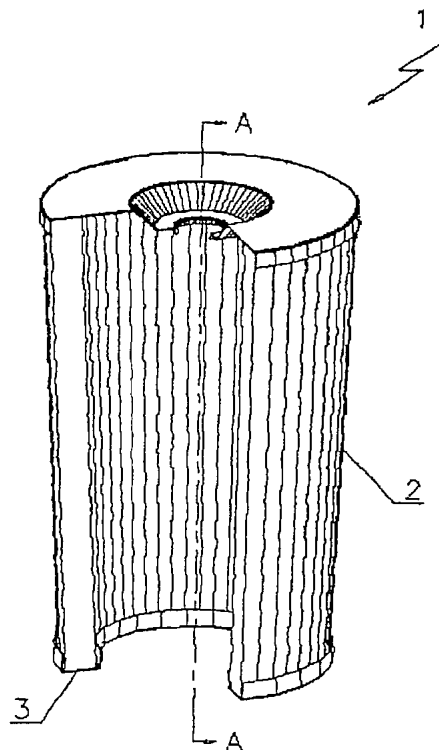
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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

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(54) Title: INTERSECTED CONE-SHAPED AIR FILTER FOR AN AUTOMOTIVE INTERNAL COMBUSTION ENGINE



(57) Abstract: This invention relates to an intersected cone-shaped air filter (1) for focusing air flow within an automotive internal combustion engine which substantially comprises a hollow body (2) of specified thickness whose side dips 2° to 7° with respect to vertical axis, and a clamping ring (3) which is fixedly disposed along the outer periphery of the upper and the lower ends of the filter body (2) for strengthening the filter body construction. The air filter body is made up of symmetric longitudinally folded filter paper materials whose thickness governs that of the air filter body (2).

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Description

5 INTERSECTED CONE-SHAPED AIR FILTER FOR AN AUTOMOTIVE  
INTERNAL COMBUSTION ENGINE

## Technical Field of Invention

10 This invention relates to an air filter, particularly  
an intersected cone-shaped air filter that can focus airflow  
into an automotive internal combustion engine.

## Background of Invention

15 Current automotive technology needs automotive engines  
of high performance. A highly performed automotive engine  
requires that fuel must be proportionately mixed with clean  
air and the mixture produced can quickly reach the internal  
combustion charge.

20 There are two options for the accomplishment of the  
conditions cited above. The first is to minimize fluid  
friction, and the second one is to exert a driving force on  
the mixture. It can be performed only by designing  
appropriately the aerodynamic construction of the air  
25 filter.

The object of this invention is thus to provide an air  
filter wherein a driving force is performed due to the  
focusing of the airflow on the midmost streamline. Based on  
its shape, i.e., intersected cone, the air filter is  
30 referred to CYCLO FILTER.

## Brief Description of the Invention

35 This intersected cone-shaped air filter is designed for  
the purpose of filtering the air flowing into an automotive  
internal combustion engine and focusing it to the midmost  
streamline. Due to its intersected conical shape, the  
effective area of this air filter's cylindrical surface is

advantageously larger than that of previously adapted filters.

The larger the effective area of this air filter's cylindrical surface is, the more the mass of the air-fuel mixture that will flow into the combustion chamber. And the driving force resulted in due to the focusing of air flow on the midmost streamline will increase the velocity and the mass of the air-fuel mixture within the combustion chamber. Consequently, it will be generated by the automotive engine.

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#### Brief Description of the Drawing

Figure 1a is a perspective view of the air filter presently invented with body being partially opened.

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Figure 1b is a longitudinal cross section along line A-A of the embodiment, in shown in Figure 1a.

Figure 2a is a perspective view of the modification of the air filter presently invented with body being partially opened.

20

Figure 2b is a longitudinal cross section along line A'-A' of the embodiment in shown in Figure 2a.

Figure 3 is a schematic diagram showing the path of the airflow from the atmosphere into an automotive internal combustion engine.

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#### Detailed Description of the Invention

Figure 1a and 1b show a basic construction of an intersected cone-shaped air filter (1) comprising a hollow body (2) of specified thickness the side of which dips downwardly  $2^{\circ}$  to  $7^{\circ}$  with respect to vertical axis. The filter body is made up of symmetric longitudinally folded filter paper materials whose thickness governs the thickness of the air filter body (2).

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A clamping ring (3) is fixedly disposed along the outer periphery of the upper and the lower ends of the filter body (2) for strengthening the filter body construction.

Figure 2a and 2b show the one of the modifications of the cone-shaped air filter, which have specifics hollow body (2'). The outer wall body of the air filter shape is cylindrical and the inner wall body of the air filter shape is intersected cone.

Figure 3 is a schematic diagram showing the path of the air flow from the atmosphere into an automotive internal combustion engine. Air from the atmosphere is directed to an air filter (I) through the air filter body. Owing to the shape of the filter, the air flows through the centre of the smaller end of the filter into the mixing chamber (II). The air and fuel which have become air-fuel mixture after entering the mixing chamber, flows further into the combustion engine (III). The driving force resulted in due to the focusing of the airflow on the centre of the smaller end of the filter will increase the velocity and the mass of the air-fuel mixture within the combustion chamber.

The preferred embodiments described within this specification are intended only for illustration, not to limit the scope of invention. Modification of any kind is always possible for them skilled in the art as long as it is still within the scope of invention and claim.

## Claim

1. An intersected cone-shaped air filter (1) for focusing  
air flow within an automotive internal combustion  
engine which comprises:  
5 a hollow body (2) of specified thickness whose  
side dips  $2^{\circ}$  to  $7^{\circ}$  with respect to vertical axis and  
is made up of symmetric longitudinally folded filter  
paper material whose thickness governs the thickness  
10 of the air filter body (2),  
a clamping ring (3) which is fixedly disposed  
along the outer periphery of the upper and the lower  
ends of the filter body (2) for strengthening the  
filter body construction.  
15
2. An intersected cone-shaped air filter that have a  
hollow body (2') whose outer wall of the air filter  
body shape is cylindrical and the inner wall of the  
air filter body is intersected cone.  
20
3. An intersected cone-shaped air filter, which has a  
hollow body shape as described on claims 1 and 2, made  
of the porous material.

## AMENDED CLAIMS

[received by the International Bureau on 03 May 2001 (03.05.01);  
original claims 1-3 replaced by amended claims 1-4 (1 page)]

1. An intersected cone-shaped air filter (1) for focusing air  
flow within an automotive internal combustion engine which  
comprises:  
a hollow body (2) of specified thickness whose side  
dips 2° to 7° with respect to vertical axis and is made up  
of symmetric longitudinally folded filter paper material  
whose thickness governs the thickness of the air filter body  
(2),  
a clamping ring (3) which is fixedly disposed along  
the outer periphery of the upper and the lower ends of the  
filter body (2) for strengthening the filter body  
construction; and the way out of clean air is on the top of  
intersected cone.
2. An intersected cone-shaped air filter according to claim 1  
that has a hollow body (2') whose outer wall of the air  
filter body shape is cylindrical and the inner wall of the  
air filter body is intersected cone.
3. An intersected cone-shaped air filter, which has a hollow  
body shape as described on claims 1 and 2, made of the  
porous material.
4. An intersected cone-shaped air filter according to claim 1  
for producing driving force that increases the velocity and  
the mass of the air- fuel mixture.



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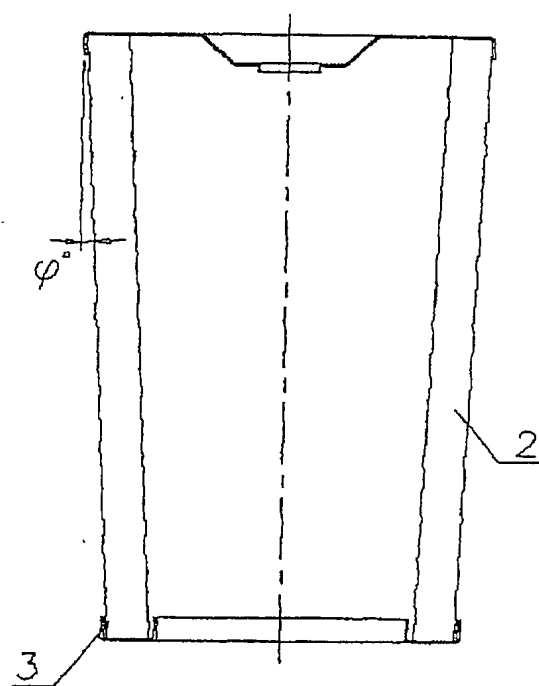
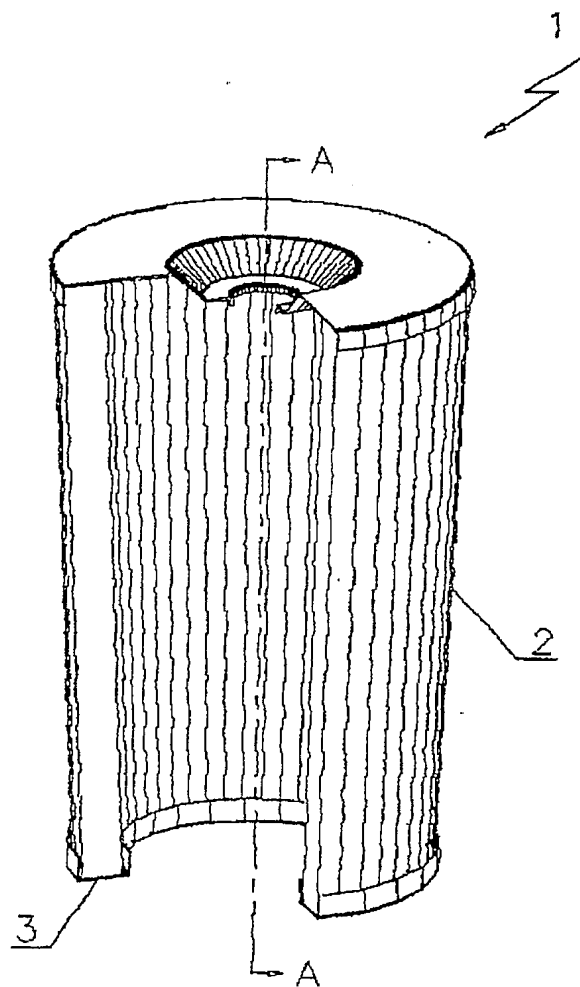


Figure 1a

Figure 1b

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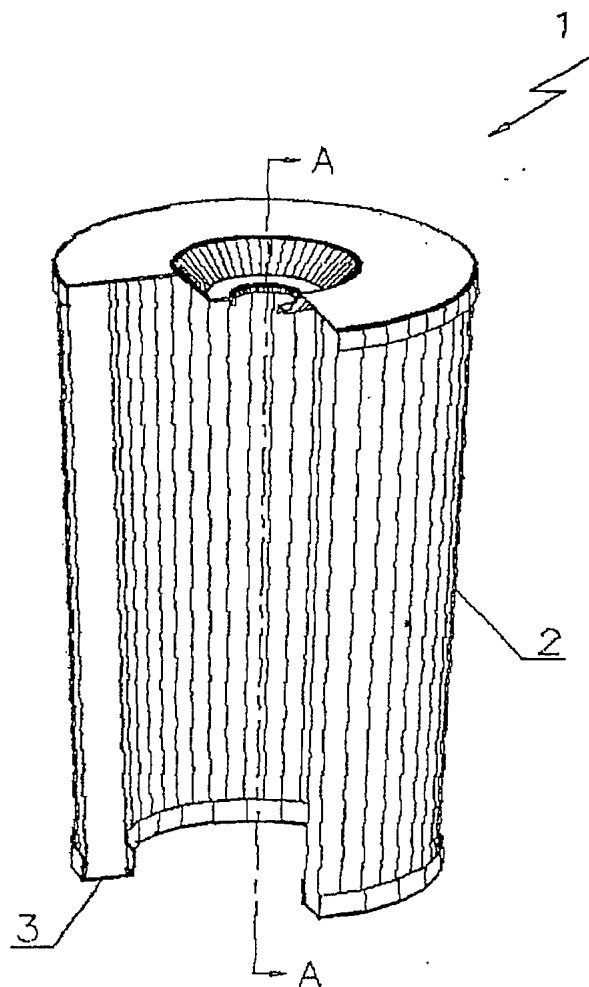


Figure 2a

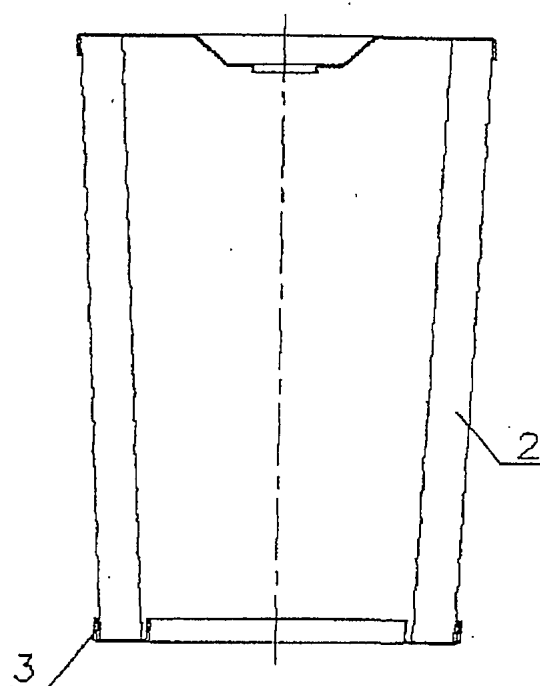


Figure 2b

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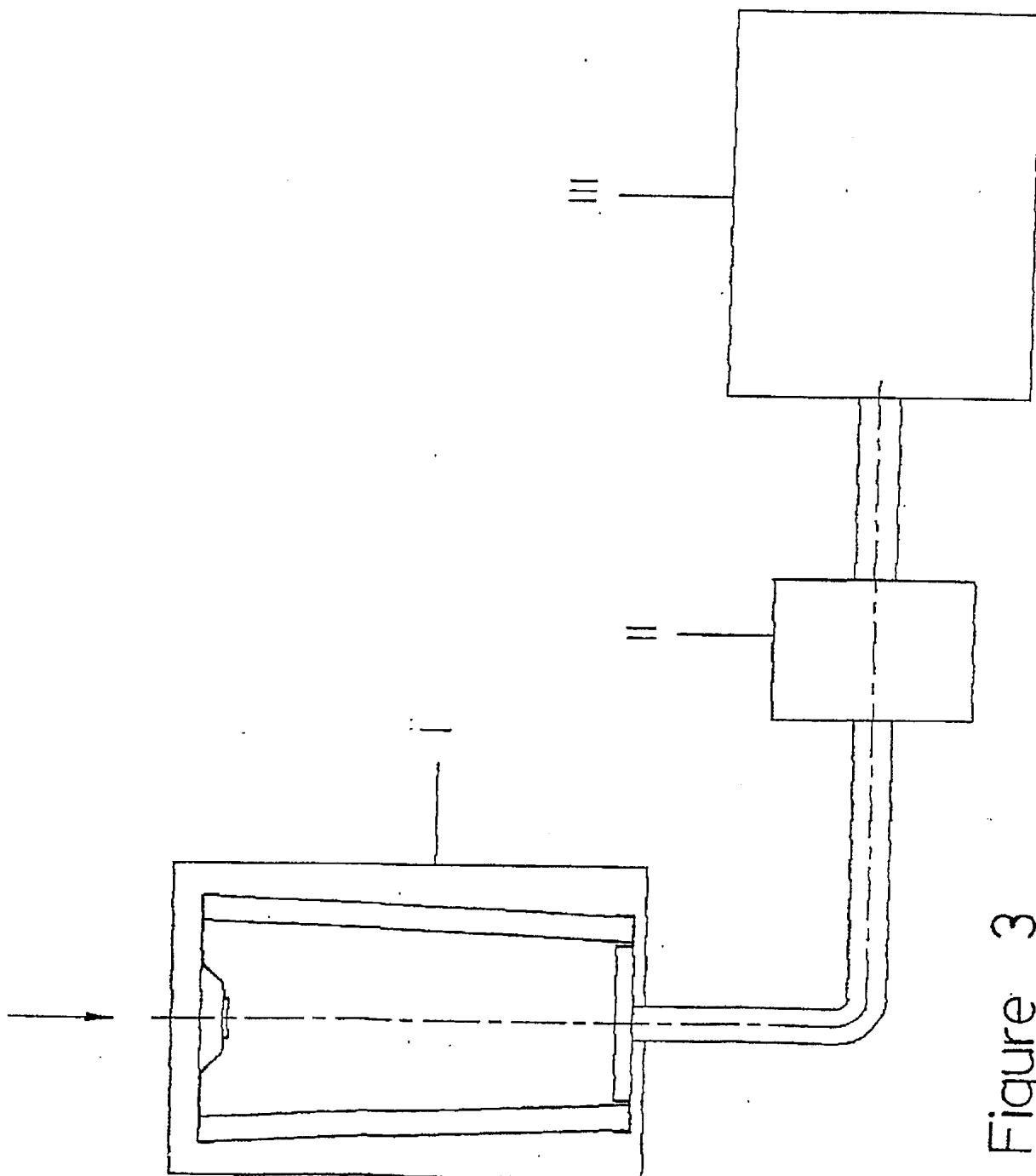


Figure 3

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/00852

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 F02M35/024

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 F02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

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X	US 4 498 915 A (WITCHELL) 12 February 1985 (1985-02-12) abstract column 4, line 20 - line 35 ----	1,3
X	WO 00 25894 A (DONALDSON) 11 May 2000 (2000-05-11) page 8, line 21 -page 9, line 5; figure 5 ----	1,3
A	FR 2 214 505 A (C.F.E.A.) 19 August 1974 (1974-08-19) page 3, line 23 - line 35 page 4, line 26 - line 30; figures 1,5 ----	1,3
A	DE 18 01 161 A (PUROLATOR) 16 April 1970 (1970-04-16) page 9, line 26 - line 36; figure 3 ----- -/-	1,3

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## INTERNATIONAL SEARCH REPORT

Inventor's Application No  
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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